SAFETY HELMET INCORPORATING INTERFACE FOR RADIO COMMUNICATIONS

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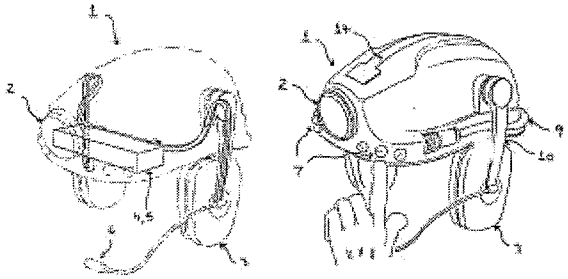
Cited documents:

- GB2161696 (A)
- AU8035091 (A)
- AU5250190 (A)

Abstract of **WO 9402043 (A1)**

Headwear comprising a support adapted to be carried on the head of a user, illuminating means (2), communication means (4, 5) and control means (7) therefor, said illuminating means, communication means and control means being operatively connected to said support.



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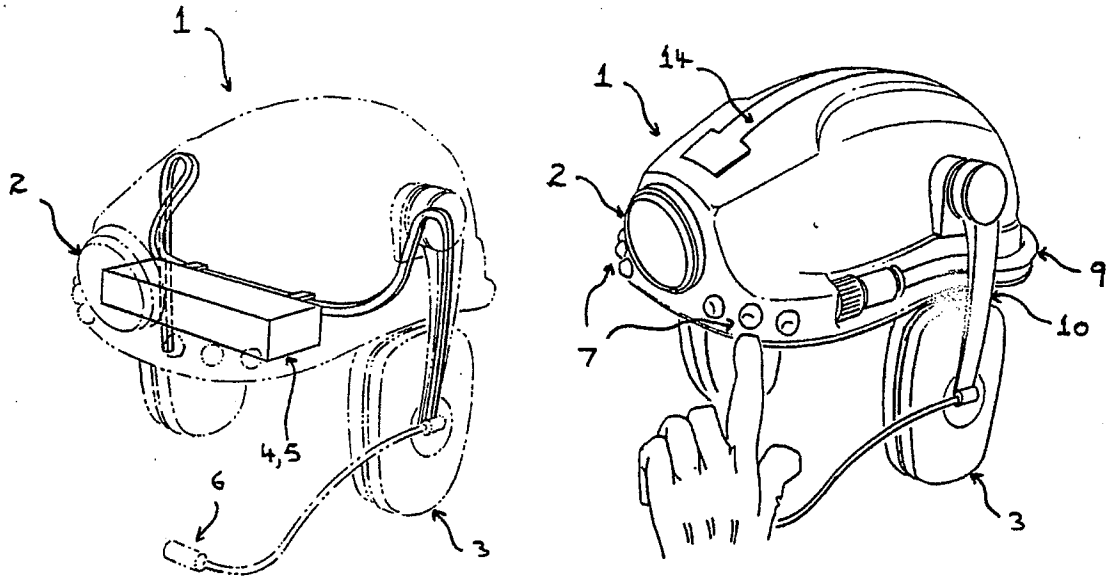

(57) Abstract

Headwear comprising a support adapted to be carried on the head of a user, illuminating means (2), communication means (4, 5) and control means (7) therefor, said illuminating means, communication means and control means being operatively connected to said support.

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SAFETY HELMET INCORPORATING INTERFACE FOR RADIO COMMUNICATIONS

The present invention relates to headwear incorporating communication equipment. Whilst the invention is according to one embodiment, directed towards and is primarily described with reference to a miner's safety helmet which incorporates an illumination device, it will be appreciated that the present invention is suitable for other applications, such as in industry, for recreational purposes such as caving and the like and for emergency services, police and military applications.

BACKGROUND OF THE INVENTION

Typically miner's safety helmets incorporate an illumination device arranged such that when worn by a user the illumination device provides a beam of light in front of the user. Such devices are generally powered by a battery carried by the user, usually attached to the user's belt. In mining applications it is also necessary for miners to remain in radio communication with each other and their base or control room. Such radio communication is usually by means of hand held radios which must be carried or worn by the user. This can be detrimental to a miner's ability to work in a mining environment, typically underground. Firstly, miners wear gloves which makes the carrying or operation of radio equipment difficult. Secondly as in most occupations their hands are required to attend to various functions to carry out their tasks and their necessity to carry and operate known radio equipment hinders or detracts them from using their hands for other tasks.

It is known to utilize radio communication in motor cycle, bicycle and air pilot helmets. However, such known helmets are not suitable for use in applications such as mining applications. Generally pilots helmets are connected to a radio unit within the plane. Motor cycle and bicycle helmets with radio communication generally utilize wireless intercom. Such systems are not suitable for mine use.

According to one aspect of the present invention there is provided headwear comprising a support adapted to be carried on the head of a user, illuminating means, communication means and control means therefore, said illuminating means, communication means and control means being operatively connected to said support.

According to another aspect of the present invention there is provided headwear comprising a support adapted to be carried on the head of a user, communication means and control means therefore operatively connected to said support and a visual display operatively connected to said support so as to be in the field of view of the user when wearing the headwear said visual display being adapted to indicate the status and/or function of said control means. This embodiment may further include illuminating means operatively connected to the support.

The communication means may be in the form of a two way radio having at least one receiver and at least one transmitter. Preferably the radio is housed within the support. The radio may include an antenna mounted to or integral with the support so that it generally follows the contour thereof.

The support may include an ear muff section, the ear muff section having at least one receiver positioned therein.

The illumination device may comprise a lamp for projecting a light beam in front of the user.

In one form the control means incorporates a power source. In another form control means is connected to a power source.

Preferably the control means comprises at least one push button for controlling the communication means and/or illumination means.

Preferably the support is in the form of a helmet to be worn on the user's head.

The invention will now be described by way of a non-limiting example with reference to the following drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 depicts a perspective view of one embodiment of the device of the present invention.

Figure 2 depicts a perspective view of the device of Figure 1 utilizing phantom lines to depict the outline of the device whilst bold lines depict the positioning of a radio.

Figure 3 depicts a perspective view of the device as in Figure 1 with a schematic view of a user's hand about to push a control button.

Figure 4 depicts a perspective view from below of the device of Figure 1 with ear muffs and support brackets removed.

Figure 5 depicts the device of Figure 1 in a side view on a user's head.

Figures 6 and 7 depict cross sectional schematic views of one embodiment of a push button arrangement incorporating magnet/flux detector operation.

MODE FOR CARRYING OUT THE INVENTION

One embodiment of the present invention comprises a helmet 1, an illumination device (lamp) 2, ear muffs 3 and a two way radio 4. The two way radio 4 comprises a radio housing 5, a microphone 6 and control buttons 7 mounted on a control panel 8.

The power source for the illumination device (lamp) 2 and radio 4 may preferably be a common source such as a battery (not shown), worn by the user on a waist belt or

webbing or the like, the battery being connected to the helmet 1 by power cable 9.

The ear muffs 3 are connected to the helmet 1 by support brackets 10. In this embodiment the output speakers (not shown) of the radio 4 are positioned in the ear muffs 3 and connected to the radio housing 5 which is positioned in the forward portion of the helmet 1 (see Fig. 2). The microphone 6 projects from an ear muff 3.

The control buttons 7 at the front of the helmet are for finger tip operation of the lamp 2 and radio 4. The control buttons typically used for controlling on/off, receive/transmit switching, channel selection, volume and other radio functions.

The radio 4 in this embodiment utilises a strip antenna (or aerial) 14 positioned on the upper surface of the helmet 1, (see Figs. 1 and 3). Such a strip antenna is useful in that it is close to the contour of the helmet and therefore does not present a potential hazard for snagging or damage when the user is wearing the helmet in low roof clearance and narrow passage environments.

The helmet 1 also incorporate LED (light emitting diode) display units 13 on the forward portion of the cap (see Figs. 4 and 5).

In use the helmet 1 is worn by the user, and as the radio 4 is incorporated within the helmet 1, it negates the necessity of a radio to be held in the hands of the user. The positioning of the ear muffs 3 and speakers 11, as well as the microphone 12, means that the user can receive and transmit messages with relative ease. The use of the control buttons 7, preferably of a push button design allows for quick and easy use, particularly when the user has gloved hands (see Fig. 3).

The LED display units 13 are positioned on the helmet 1 such that the user can easily verify status of radio communication functions, as the display units 13 are in the user's field of view (see Fig. 5). This means that a user of the helmet 1 can easily check receive/transmit, on/off, channel selection and other functions etc. with ease and without distraction of the task at hand. The display units 13 can be of different colours ie. red for transmit, green for receive etc. or may designate various functions by flashing etc.

The helmet 1 in a particular embodiment may incorporate control buttons 7a which comprise a magnet 15 mounted on a resilient support 12 (see Fig. 6). The change in position of the magnet 15 (ie. when button 7a is pushed) relative to a flux detector 17 can be utilized to control current flow in the device to be operated ie. such as the radio or lamp.

In further not shown embodiments the support brackets 10 of the abovementioned embodiment can utilize one or more hollow sections such that speech from the operator to the radio microphone and/or from the radio speaker to the user's ear can be transferred in the form of acoustic energy. This is particularly desirable where the device is to be used in hazardous situations where electrical transmission is dangerous ie. gaseous environments.

In a further not shown embodiment the helmet and/or control panel upon which the control buttons are mounted may be recessed in a manner to form guides near the control buttons. The recesses acting as guides for the users fingers.

In further not shown embodiments the helmet of the present invention may have features such as the microphone, speakers, control buttons, aerial, radio, display units and other functional features which differ in configuration or operation to that of the embodiment shown.

In further not shown embodiments the present invention includes a radio communication device adapted to be strapped on an existing mining helmet or the like and utilize a common power source. Such a device could include the necessary control buttons, speaker and microphone and display units to operate. Preferably such a radio communication device would be connected to the contacts of a standard miner's cap lamp and utilize a common power source.

In a further not shown embodiment the helmet may incorporate a battery within the helmet thereby eliminating the necessity of a separate battery unit.

The device of the present invention has the following advantages. In mining and other applications where the environment is dark or dim, a user with a helmet incorporating both a lamp and radio has the possibility of leaving behind a radio at a work or rest location reduced, as miners rarely travel throughout a mine without their helmet.

Also the device of the present invention can be used as a tracking device, the radio incorporated within the helmet outputting a digital signal such that the user can be tracked. This is of advantage such that a user can be located by his base and is of importance during emergency situations. The tracking of users can also be beneficial in monitoring users around restricted areas.

Whilst the preferred embodiment has been described with reference to a miner's helmet, the device may be utilized in other environments an uses.

It should be obvious to those skilled in the art that numerous variations and modifications could be made to the device of the present invention as described and with reference to the drawings without departing from the overall scrope or spirit of the invention.

THE CLAIMS:

1. Headwear comprising a support adapted to be carried on the head of a user, illuminating means, communication means and control means therefore, said illuminating means, communication means and control means being operatively connected to said support.

2. Headwear comprising a support adapted to be carried on the head of a user, communication means and control means therefore operatively connected to said support and a visual display operatively connected to said support so as to be in the field of view of the user when wearing the headwear said visual display being adapted to indicate the status and/or function of said control means.

3. Headwear according to claims 2 further including illuminating means operatively connected to said support.

4. Headwear as claimed in claims 1, 2 or 3, wherein said communication means is a two way radio having at least one receiver and at least one transmitter.

5. Headwear as claimed in claim 4, wherein said radio is housed within said support.

6. Headwear as claimed in any one of claims 1 to 5, wherein the radio includes an antenna mounted to or integral with said support so that it generally follows the contour thereof.

7. Headwear as claimed in any one of claims 1 to 6, wherein said support includes an ear muff section, said ear muff section having at least one receiver positioned therein.

8. Headwear as claimed in any one of the preceding claims, wherein said illumination device comprises a lamp for projecting a light beam in front of said user.

9. Headwear as claimed in any one of the preceding claims, wherein said control means incorporates a power source.

10. Headwear as claimed in any one of claims 1 to 8, wherein said control means is connected to a power source.

11. Headwear as claimed in any one of the preceding claims, wherein said control means comprises at least one push button for controlling the communication means and/or illumination means.

12. Headwear as claimed in claim 1, wherein said device comprises a visual display unit for indicating status of functions of said control means, said visual display unit in the field of view of a user when said device is worn by said user.

13. Headwear as claimed in claim 2 or claim 11, wherein said visual display unit is at least one light emitting diode.

14. Headwear according to any preceding claims, wherein said support comprises a helmet.

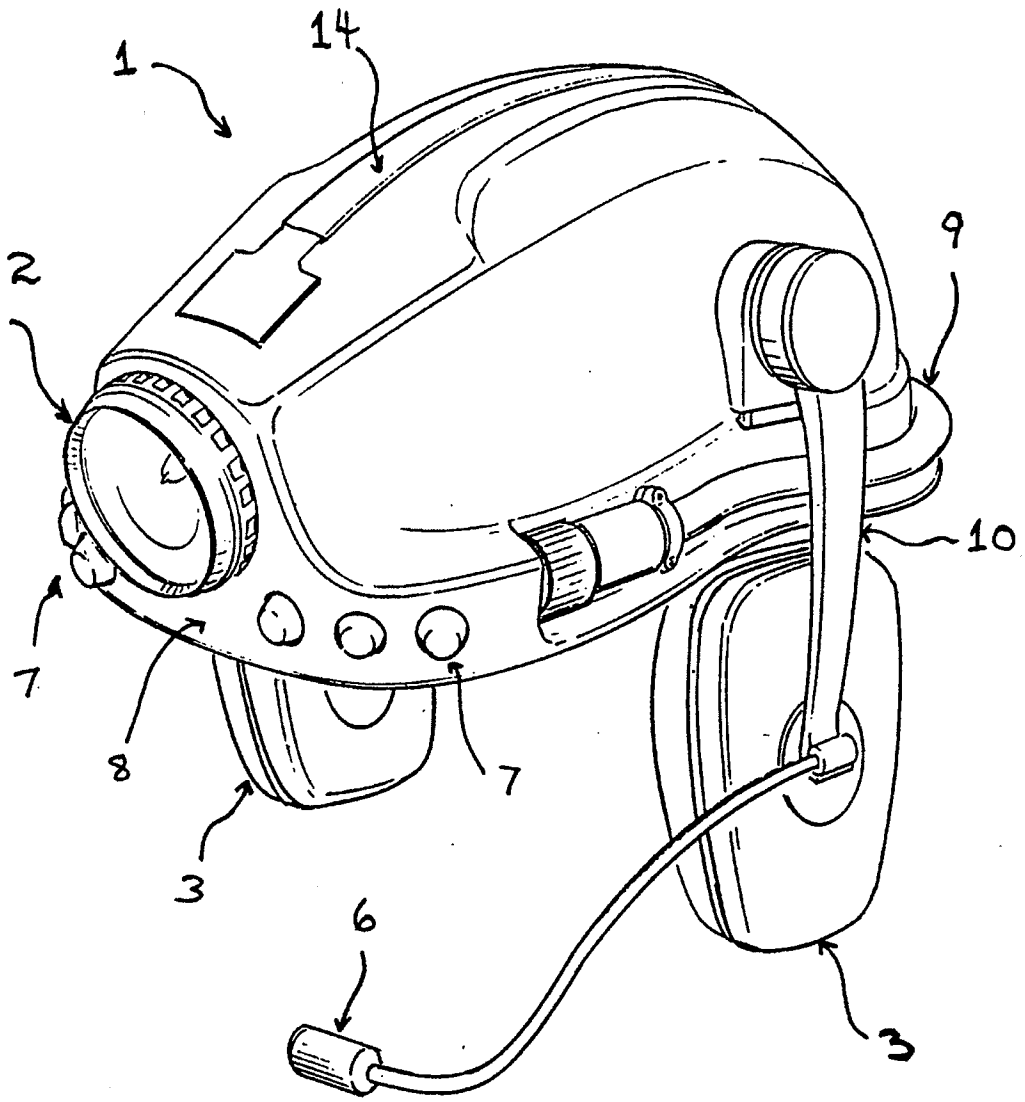

FIG. 1

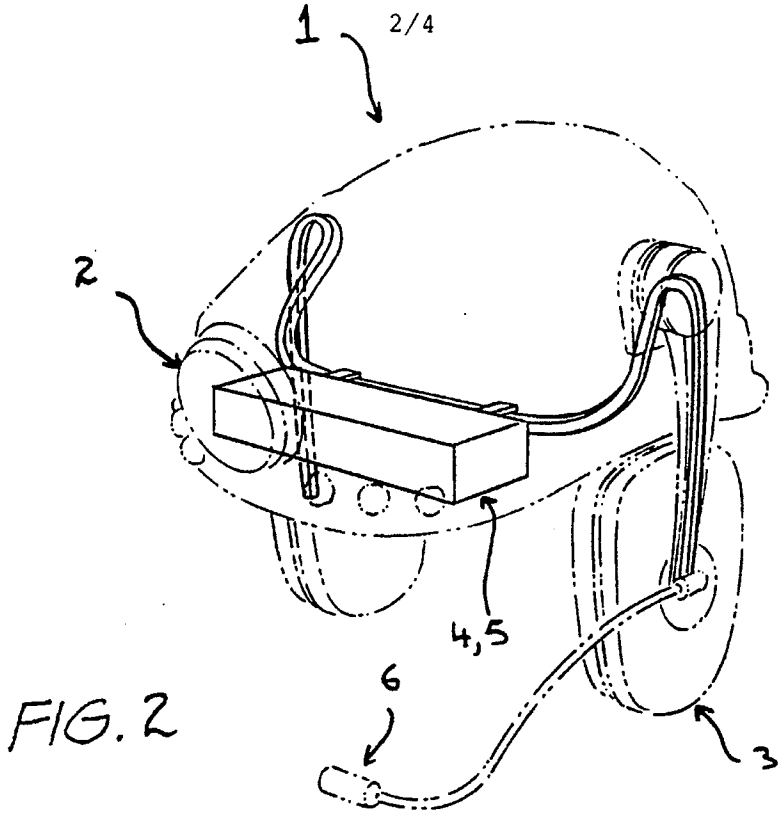

FIG. 2

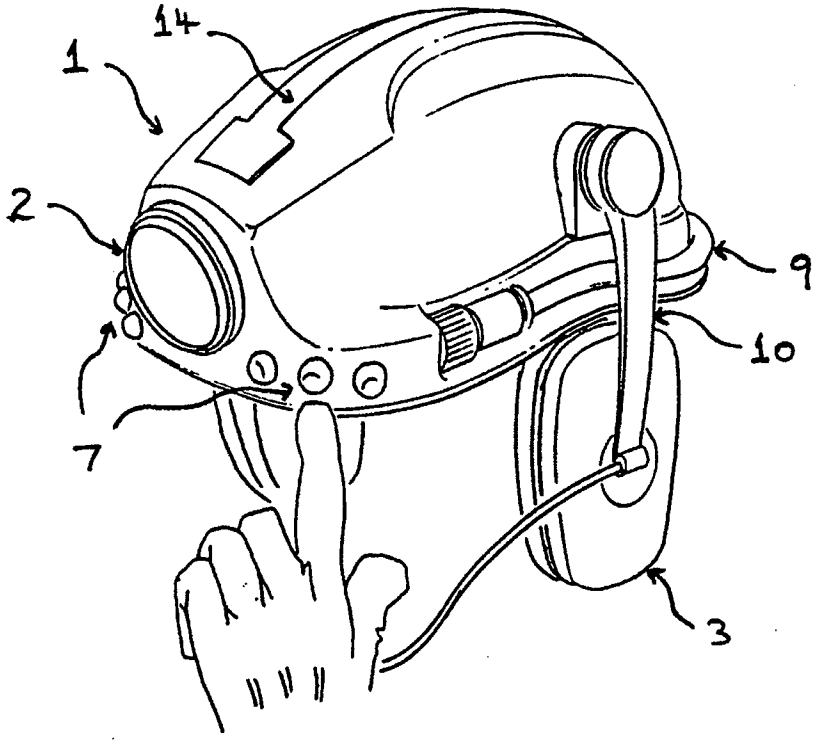

FIG. 3

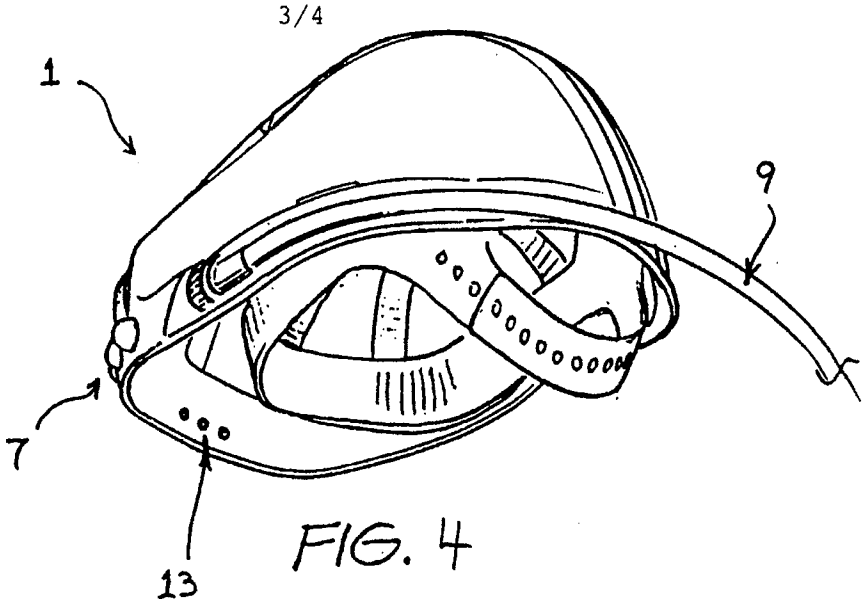

FIG. 4

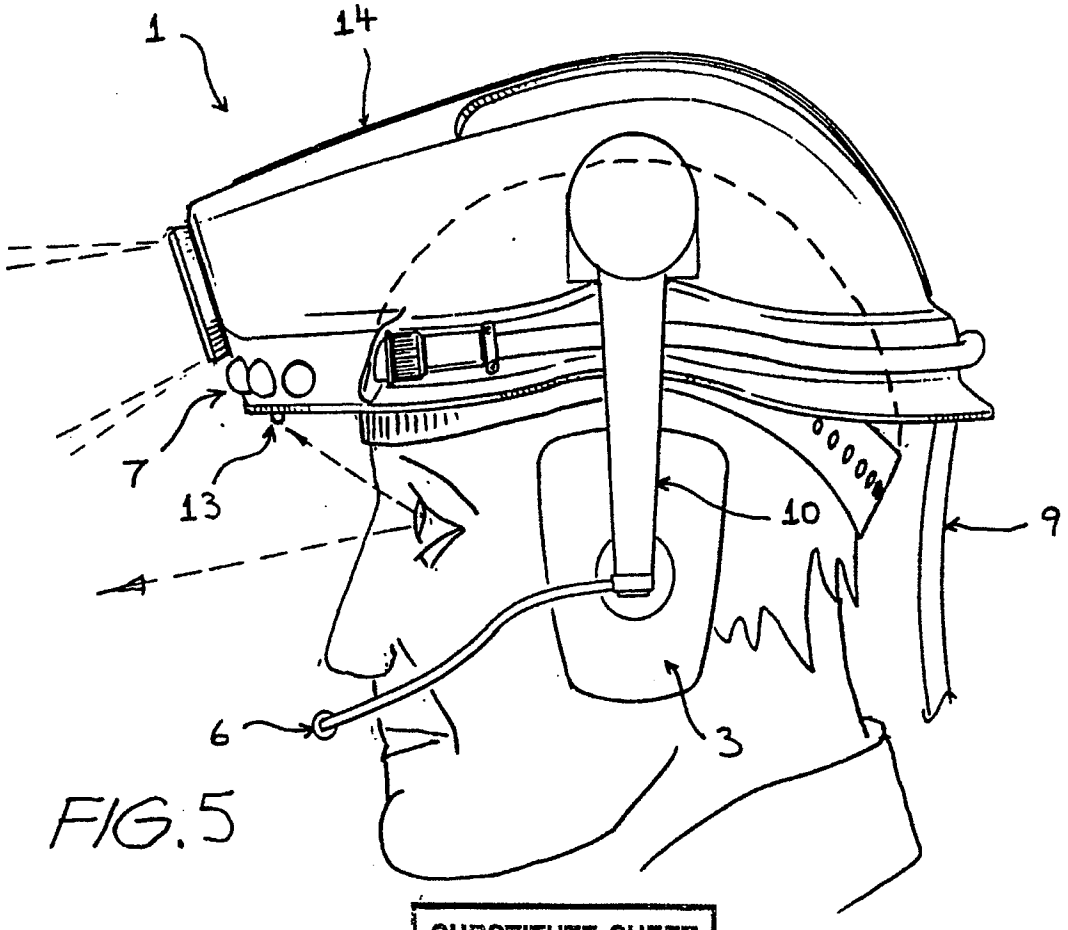

FIG. 5

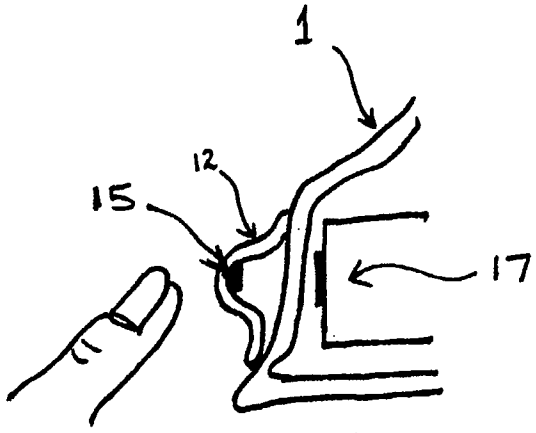

FIG. 6

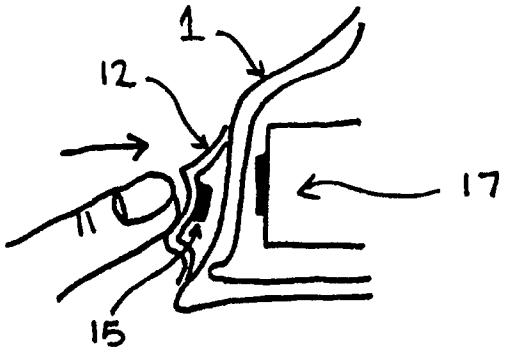

FIG 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 93/00382

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl.[5] A42B 3/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC A42B 3/30, 3/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU : IPC as above

Electronic data base consulted during the international search (name of data base, and where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
X	GB,A, 2161696 (DAVIES) 22 January 1986 (22.01.86) See page 2 lines 7-105	1,2,4-7,9,10,12-14
X	AU,A, 80350/91 (CAIRNS & BROTHER INC) 16 January 1992 (16.01.92) See Abstract Page 37	1,2,4-7,9,10,12-14
A	AU,A, 52501/90 (PLANTRONICS INC) 8 November 1990 (08.11.90) See Fig 1	1,2,4-7,9,10,12-13

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
17 October 1993 (17.10.93)	4 NOV 1993 (4.11.93)
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. 06 2853929	Authorized officer P. WARD Telephone No. (06) 2832129

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
AU	80350/91	EP	465971	CA	2045241	MX	9100168
AU	52501/90	EP US	396300 4917504	JP	3128555	NZ	233155
							END OF ANNEX